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# THE MÁLAGA RAISIN DISTRICT: A STUDY OF MEDITERRANEAN AGRICULTURE

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Plum pudding owes its place in English tradition to a long-established trade with Mediterranean countries. The grapes grown in western Europe north of the Alps do not contain enough sugar to make raisins. But in certain favored Mediterranean lowlands the hot and sunny summers cause the fruit to become very sweet, and raisins have been a staple food there since ancient times. At present Spain, France, Italy, and Greece contain about three-fourths of Europe's vineyard land, producing wine grapes, table grapes, and raisin grapes. While the preservation of fruit by drying is a widespread practice in the countries bordering the Mediterranean Sea, three areas long have enjoyed special fame for their raisin exports. Vineyardists in the Málaga district of southern Spain take pride in their large and rich-flavored raisins, generally sold on the stem; the Smyrna area of Asia Minor is the original source of sultana raisins, made from small seedless grapes of the variety to which the "Thompson seedless" belong; and the lowlands bordering the Gulf of Corinth in southern Greece produce the small seedless raisins known commercially as currants. It is said that raisins occasionally found their way into England as long ago as Medieval times. In early days, when few ships plied the seas and every community produced its own food, imported raisins were a luxury reserved for special occasions.

## A SPANISH RAISIN-GROWER'S ESTATE

Hacienda Torres has a convenient location two or three miles west of the raisin-shipping port of Málaga, which lies near the path of all ships entering the Mediterranean via the Strait of Gibraltar. The estate contains about 125 acres planted to muscat grapes, the variety preferred by Spanish raisin-growers because the fruit has a high sugar content, an early maturing habit, a deli-

cate skin, and relatively little juice. The owner, Señor Casado, lives in Málaga, devoting much of his time to the marketing problems of the raisin industry. Formerly his home was the vine-shaded stone house situated in the midst of the vineyards (Fig. 1); but competition in world markets has become so keen that the producers now keep up a year-round campaign of advertising and soliciting orders. Señor Casado lives on the estate during the harvest season, giving his personal attention to the collection and curing of the crop. Located where the hilly vineyard country merges into the *huerta* land on the delta of the Guadalhorce and Guadalmedina rivers (Fig. 2), Hacienda Torres contains some land equipped with irrigation facilities. In exceptionally dry years this land may be watered once in June, but only this once. Málaga raisin-growers believe that irrigation lowers the quality of the crop, tho it may cause the grapes to attain large size. In fact, very little irrigable land in Spain is devoted to vineyards.

Fig. 1. Vineyard land west of Málaga. The vine-shaded stone house in the foreground is the owner's residence on Hacienda Torres.

**Seasons in the Vineyards.** The vineyards of Hacienda Torres are located in an area where nature supplies barely enough moisture for viticulture, and the vines annually struggle against thirst. This struggle contributes to the quality of the raisin grape. The rainfall during the seven months from October thru April averages about sixteen inches, but the summers are dry (Fig. 3). The ground remains unfrozen thruout the mild winter and hence absorbs moisture when rain falls. The storage of water in the ground during the cooler season means much to the vineyards, for the rainfall of the five-month period from May to September generally amounts to less than two inches. Humidity and genial temperatures in early spring encourage the opening of buds and the growth of leafy shoots. May and June show a decided tendency toward aridity, for decreasing frequency of showers is associated with rising temperature. Within

FIG. 2. Section of Málaga raisin district.

this period the vines bloom and the fruit is formed. Rarely does rain fall in July and August, the season when the fruit is maturing. For example, in eight of the fifteen years from 1913 to 1927 no rain fell in either July or August, and during the whole period rain fell on only fourteen days in these months. Hot weather, bright sunshine, and a growing scarcity of moisture stimulate the accumulation of sugar in the fruit, a process of much significance to the

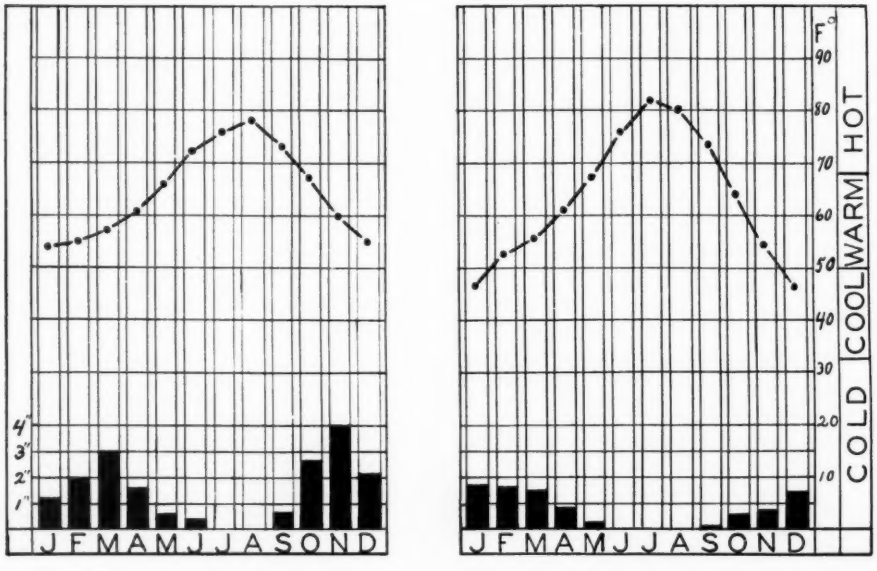


FIG. 3. Average monthly temperature and rainfall of Málaga and of Fresno (California) during a recent fifteen-year period.

raisin industry, since fruit with a low sugar content would become shriveled and unattractive on the drying floors.

**Vineyard Practices Adapted to Water Scarcity.** The culture of the raisin grape belongs to the group of industries known in Spain as *secano* agriculture. *Secano* land depends upon an irregular rainfall which is particularly scant in the hotter months. Cultural methods, as well as the selection of crops and the spacing of plants in the field, aim to make the most of a scanty moisture supply. The muscat grape can get a living in hotter and drier summers than many agricultural plants can endure. Its long tap root penetrates to deep places in search of the precious ground-water. In addition, the vine sends out long feeder roots to explore the upper soil layers that may be moistened by passing showers.

The spacing of plants in the vineyards of Hacienda Torres reflects the scarcity of moisture. In order that each vine may have first claim to the moisture resources of a considerable body of soil, the vines on the estate are planted at least six feet apart (Fig. 1). Knowing the qualities of each field, Señor Casado plans the spacing according to the nature of the soils and the amount of ground-water available. Too close spacing would result in lowered yield, but an over-generous supply of moisture would encourage leafy growth at the expense of fruiting. Hence the purpose of the vineyardist is to give the vines adequate space but to subject them to some degree of crowding.

FIG. 4. Raisin grapes ready for harvest in one of the vineyards of Hacienda Torres.

The training of the vine also bears witness to the need for conserving the scanty soil moisture. There is no trellising, in contrast to the practice in irrigated vineyards or in such humid grape-growing areas as the Rhine Valley and western Michigan. Pruning reduces each vine to a gnarled stub a few inches high, with four or five stout branches about a foot long. From these short branches the fresh leafy shoots spread out to a distance of two or three feet, forming a low canopy that shades the ground and hinders the evaporation of moisture from the soil. The grapes grow in large clusters near the base of the new shoots and thus are held off the ground tho hanging near it (Fig. 4).

Work in the vineyards during the cooler season aims to increase the storage capacity of the soil in order that as much moisture as possible may be conserved for use during the drought of summer. After the leaf-fall and the pruning of the vines, the soil is worked

repeatedly—one deep plowing and several shallow cultivations. A Spanish proverb declares that weeds and a crust on the soil are the two great enemies of the *secano* farmer.

**Advantages of a Sunny Harvest Season.** The grape crop of Hacienda Torres ripens in August, practically a rainless month in most years. Fair weather during the vintage pleases the raisin-grower, for rain would interrupt the collection of the grapes and injure their quality. Sunny days in harvest also permit the growers to prepare sun-dried raisins of high quality. In some competing Mediterranean areas where the autumn rains begin early, it is customary to dip the grapes in a lye solution in order to cut down the time required for drying. In a few Spanish communities where raisins are prepared in small quantities for local use, the grapes are dried in the outdoor ovens built for baking bread.

FIG. 5. Small part of the drying floors of Hacienda Torres. The terrain slopes toward the south and is protected by a low windbreak on the north. The slender ridge-poles support canvas covers at night and during damp weather.

**Collection and Processing of Crop.** The work of the harvest season necessitates the employment of extra labor at Hacienda Torres, for the grapes must be picked very soon after they have reached the proper degree of ripeness. Many of the pickers come from distant communities, and a long low building on the estate has been provided as temporary living quarters. For use in cooking the meals of the workers there awaits them a neatly-piled fuel supply consisting of branches pruned from the vines the preceding winter.

Since sun-drying is a slow process, a considerable amount of land at estate headquarters is laid out as drying grounds. The Málaga raisin owes much to the effects of bright sunshine during the curing period; and in order to get the maximum benefit from the late-summer rays the drying floors are built with a steep slope to the south (Fig. 5). When the grapes come in from the vineyards, men lay them in slightly-overlapping rows on the gravelly earth of the drying floors, covering the lower part of the slope first. It takes two or three weeks of bright sunshine to turn the

ripe grapes into raisins, and within the drying period the fruit is turned carefully once or twice. Before sunset and in damp weather the floors are covered to protect the drying fruit. To facilitate this, the floors are divided into sections five or six feet wide running down the slope. On some of the floors each section is provided with a tent-like roof of canvas supported by a light central ridge-pole and tied down at the sides. Other floors have roofs of overlapping boards. A triangle of heavy matting closes the upslope end of each section.

The drying season continues into September, and sometimes cloudy or foggy weather sets in before the last of the grape crop has been cured. This fact justifies the preference of the growers for an early-maturing variety. When necessary, coal fires are started in the drying house (Fig. 6) and the raisins are finished there. In many years, however, even the latter part of the vintage can be dried out of doors. In any case the grapes are exposed to the sun for six or seven days before being put into the artificial driers, for the effect of the sun is necessary to bring out the rich color desired.

FIG. 6. Raisin-drying house at Hacienda Torres. The small size of the building is in sharp contrast to the extent of the tract set apart for drying grounds. The shed at the right holds the coal supply.

**Commercial Movement.** Marketing follows close upon harvest. Before leaving the estate the raisin crop of Hacienda Torres is packed for export, this work taking place in a special building located near the drying grounds. The bunches are arranged carefully in wooden boxes, with paper placed between the layers. Boxes of several sizes are used, the standard or full-size box holding about twenty-two pounds of fruit packed in four layers. The raisin crop generally is sold thru commission houses. Export shipments move thru Málaga and go mainly to the United Kingdom. The export movement has a highly seasonal nature. The shipment of the new crop, beginning in September, rises to a maximum in October (Fig. 7), and by Christmas from 80 to 90 per cent of the export volume has left the country.

## THE MALAGA RAISIN-PRODUCING DISTRICT

The principal raisin-growing district of southern Spain consists of a narrow strip of hill country lying along the dissected southern front of the plateau. It stretches eastward from Málaga for a distance of fifty miles and extends southwestward nearly to Gibraltar. Its width does not exceed fifteen or twenty miles. In

| | 1932 | 1933 | 1934 | Average |
|---|---|---|---|---|
| | *Metric Tons* | *Metric Tons* | *Metric Tons* | *Metric Tons* |
| Jan. | 217 | 504 | 200 | 307 |
| Feb. | 324 | 308 | 190 | 274 |
| Mar. | 331 | 293 | 166 | 263 |
| Apr. | 245 | 138 | 157 | 180 |
| May | 215 | 208 | 166 | 196 |
| June | 170 | 182 | 196 | 183 |
| July | 89 | 149 | 37 | 92 |
| Aug. | 45 | 137 | 61 | 81 |
| Sept. | 2,128 | 1,004 | 1,279 | 1,470 |
| Oct. | 6,027 | 3,398 | 5,622 | 5,016 |
| Nov. | 2,771 | 2,340 | 2,700 | 2,604 |
| Dec. | 1,528 | 934 | 1,033 | 1,165 |
| Year | 14,090 | 9,594 | 11,806 | 11,830 |

FIG. 7. Monthly raisin exports from Spain during a recent three-year period. Quantities include shipments from the east-coast district near Valencia, as well as those from Málaga.

both directions from the port, a paved highway runs along the shore (Fig. 2), while a few branch highways and many unpaved roads lead inland to the rural communities. The main railway follows the valley of the Guadalhorce River, passing thru productive vineyard country, and climbing by steep grades to the plateau, where connecting lines give access to a large upland area.

Within this district raisin production is but one of many commercial interests. Diversity in production is suggested by the list of major exports shipped thru the port of Málaga (Fig. 8). However, the export volume is not a measure of production within the district. For example, the port of Málaga handles olive oil from the southern part of the plateau in addition to that produced within the coastal belt, and iron ore comes to the port from mines outside the raisin-growing district. In the case of wine and fresh fruits and vegetables, however, production within the district exceeds the export volume, for large quantities are sold in domestic markets. Furthermore, cereals have a good deal of importance in

the district (Fig. 2), tho they do not appear in the list of major exports.

**Utilization of Hill Slopes.** Málaga's fame in world trade depends largely upon *secano* agriculture, for the district is handicapped by a scarcity of level land. Hills border the narrow beach, and within twenty miles of the sea the surface reaches altitudes of more than 2,000 feet. A few short rivers, rising in the mountains that rim

| | Quantity in Metric Tons | | Value in Gold Pesetas | |
|---|---|---|---|---|
| Olive oil | | 15,148 | | 11,713,000 |
| Dried fruits and nuts | | 10,565 | | 8,370,000 |
| Raisins | 6,285 | | 3,597,000 | |
| Almonds | 2,554 | | 4,234,000 | |
| Figs | 1,725 | | 539,000 | |
| Fresh fruits | | 18,080 | | 3,680,000 |
| Lemons | 6,654 | | 1,237,000 | |
| Oranges | 5,174 | | 745,000 | |
| Grapes | 5,809 | | 1,593,000 | |
| Others | 443 | | 105,000 | |
| Fresh vegetables | | 5,829 | | 1,026,000 |
| Potatoes | 5,256 | | 869,000 | |
| Others | 573 | | 157,000 | |
| Wines | | 3,400* | | 1,728,000 |
| Iron ore | | 16,277 | | 1,406,000 |

* Rough estimate, the export volume being given in hectoliters.

FIG. 8. Major groups of export commodities shipped thru the port of Malaga in 1934.

the plateau, flow in gorges across the district. The land between the valleys of these streams is cut by many deep ravines that hold raging torrents in wet weather but are dry most of the year. The greater part of the district consists of steep slopes without available water for irrigation. *Secano* agriculture utilizes much of the hilly terrain, but many rugged or stony tracts remain untilled. On most of the uncultivated land the native vegetation serves as pasture, tho it consists mainly of shrubs or small trees. Some of the summit areas are covered with open forests in which the cork oak has a place, and cork appears among the commodities shipped in minor quantities thru the port of Málaga. On a few forested tracts the open spaces among the oaks or pines are planted to cereals in the cooler season.

The culture of drought-resistant perennials is the major factor making the rough hill country of the Málaga district productive. The vine has a prominent place in the landscape (Figs. 1 and 2), claiming more land than any other crop, and the olive ranks second in acreage. The almond also belongs to the *secano* crop combina-

tion and helps to swell the export volume. In some localities (west of the Rio Guadalmedina, for example) the culture of wheat and other drought-resistant annuals, such as the chick-pea, utilizes considerable acreages of rolling hill country. Tho interplanting is less common in Spain than in Italy, a goodly number of fields in the Málaga district bear two or three crops at a time. Vines grow among the widely-spaced olive trees in a number of localities. Some vineyards and olive groves are interplanted with winter-grown annuals, a practice reflecting the relative abundance of moisture during the cooler season.

**Huerta Culture on Alluvial Lowlands.** Irrigated land, tho restricted in amount, has much importance for the life of the Málaga area. Practically all the irrigable land of the district lies on the flood-plains and deltas of the mountain-born streams. Near the sea the river valleys widen and enclose strips of rich *huerta* land between their walls (Fig. 2). The term *huerta* literally means garden, but in Spain it applies to irrigated land utilized primarily for the culture of vegetables and garden fruits, tho cereals, clovers, and orchard fruits all may appear in the crop combination. The production of fresh vegetables and fruits for local use ranks as a major function of the irrigated land. Sugar beets and sugar cane, members of the *huerta* crop combination, contribute to the national food supply. The Málaga *huerta* also produces specialty crops for export, particularly early potatoes (Fig. 8). The mild winters (Fig. 3) permit the *huerta* farmer to plant potatoes early enough to have his crop ready for shipment by February or March. At that time the British market offers fancy prices for new potatoes.

**Warfare Against Plant Diseases and Insect Pests.** Vineyardists wage a constant warfare against the plant diseases and insect pests that threaten their crop. The cost of production is increased by the need for treating the vines annually with such substances as sulphur, arsenic, and copper sulphate. Even so, it sometimes is impossible to prevent diseases or pests from reducing the yield. These attacks, together with the irregularity of the rainfall, cause wide variations in the size of the Spanish grape crop from year to year. For example, the yield per acre in the east-coast raisin district near Valencia was less than a third as great in 1933 as in 1930, and the reduced yield was explained by a severe attack of mildew.

The most serious threat to Mediterranean vineyards in recent decades has been that of the phylloxera. This insect pest, which entered Europe from the United States about 1860, had appeared in

Málaga by 1877. In the succeeding years great losses were suffered by the raisin-growers. The insect attacks both roots and leaves, but the injuries to the root gradually kill the vine. Ordinarily a vineyard survives for several years after the phylloxera has entered it, but the yield declines steadily. During the first year the vine gives no sign above ground to indicate that the insect is feeding upon its roots. The following year the injury is great enough to cause a yellowing of the young leaves, and even at a distance an observer can recognize the centers from which the trouble is spreading. In the third year the leaves of the affected vines look dry, new shoots are short and weak, and the fruit fails to mature. The weakened vines become an easy prey for disease or other insect pests, and in the fourth year they are likely to die. No method of eradicating the pest has been found. In the infected districts viticulture has been continued only by plowing up the vineyards and replanting with vines grafted on the rootstock of some variety of American wild grape that has proved immune to injury by phylloxera. This is a costly task. Furthermore, grafting the muscat grape on American stock delays the maturing of the vine, and the vineyardist must wait four years for the first crop from his restored vineyard instead of three.

**Changes in Commercial Opportunity.** Changes in world trade argue against the costly replanting of destroyed Málaga vineyards with raisin grapes. Time was when the Mediterranean Region produced nearly all the raisins of world trade. As improvements were made in ocean transportation, wider opportunities opened for selling the sugar-rich dried fruit, and production increased. Spain's annual raisin exports amounted to 16,000 metric tons in the middle 1850's and ten years later they had risen to more than 20,000 tons. Before 1900, however, raisin production began in several areas that later developed into strong competitors. Now the exporters of Mediterranean fruit not only meet keen competition in their old markets but also find tariff barriers raised to favor their competitors. In the years just before the world war, Mediterranean countries still accounted for 86 per cent of the world's export raisins, but since 1930 they have furnished only a little more than half (Fig. 9). Of the British raisin supply, Spain furnished nearly a third in 1913 but less than 8 per cent in 1935. The decline in market opportunity is a heavy blow for Málaga vineyardists, because the vine is a long-term crop and few crops will thrive on the unirrigated hill slopes.

California's rise as a raisin-producing area illustrates what has

happened. Imports of raisins (including currants) into the United States, amounting to a thousand tons in 1821, rose with the growth of population to a maximum of 36,350 tons in 1891 and then slowly declined until in 1935 they were only 3,530 tons. The California raisin industry began in the early 1870's, and since that time the people of the United States have consumed increasing quantities of home-grown fruit in addition to the imported supply. Now the

| | 1909–13 | 1926–30 | 1931–35 |
|---|---|---|---|
| | *Metric tons* | *Metric tons* | *Metric tons* |
| Spain | 23,949 | 15,680 | 12,160 |
| Greece | 106,340 | 91,520 | 90,750 |
| Turkey | 51,078 | 37,950 | 51,040 |
| Persia | 29,902 | 17,770 | 13,680 |
| United States | Net import | 68,600 | 45,830 |
| Australia | Net import | 31,270 | 50,960 |
| Union of South Africa | — | 1,210 | 3,322 |
| Chile | 117 | 180 | 316 |
| Others | 3,414 | 5,620 | 4,782 |
| World total | 214,800 | 269,800 | 272,840 |

FIG. 9. Average annual net exports of raisins from principal producing countries during selected five-year periods.

United States produces about half the world's commercial raisin crop and ranks among the major exporters.

The Málaga and Fresno (California) raisin districts show certain striking similarities, but each has advantages which the other lacks. Both Fresno and Málaga receive the greater part of their rainfall in the cooler months, but only about half as much rain falls in Fresno as in Málaga (Fig. 3). Therefore the California growers irrigate their vineyards, while the Málaga vineyardists are spared that expense. In both districts the dry and sunny harvest season allows the grapes to be sun-dried. However, September rain is less common in Fresno than in Málaga and the air is drier (Fig. 10), hence California growers do not cover their drying fruit at night and have not found it necessary to build drying-houses. The Málaga district has the advantage of a seaboard location fronting on a busy commercial highway and within about a week's voyage of the European Manufacturing Belt, which buys more than 80 per cent of the world's export raisins. Fresno has an inland location but lies within a country whose 127,000,000 people constitute one of the world's major markets, and which charges a high import duty on foreign raisins. The 23,000,000 inhabitants of Spain make up a relatively small domestic market, and the bulk of the Málaga raisins

are sold in countries where import duties have been levied against them to protect home-grown or colonial products.

### MALAGA DISTRICT AS TYPIFYING MEDITERRANEAN REGION

The Málaga district displays certain features characteristic of the Mediterranean Region as a whole. Tho it has mineral wealth it is known primarily as an agricultural area, its cultivated land producing staple commodities for local use and specialties for export. *Secano* agriculture surpasses irrigation in areal extent, for both

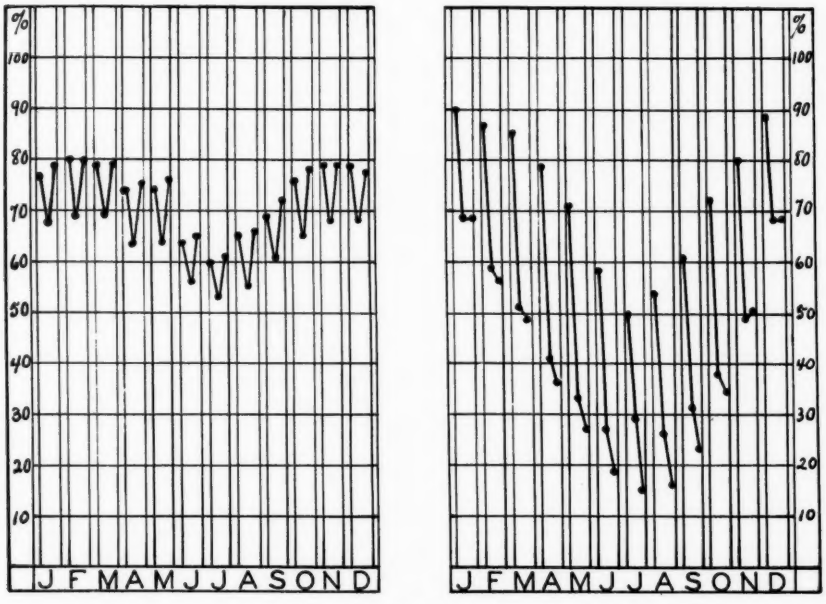


FIG. 10. Average trend of relative humidity at Málaga and at Fresno. In the column for each month are given in order the average relative humidity for early morning, noon, and late afternoon.

water and level land are scarce. The *secano* crops furnish a relatively small number of commercial products, wine, raisins, olives, olive oil, and almonds having much importance in the foreign trade of Mediterranean countries, while cereals are grown mainly for domestic markets. Irrigated crops occupy smooth lowland areas watered from streams or wells. Unfortunately, irrigable tracts are small and scattered, both in the Málaga district and in other parts of the region. The irrigated land, once devoted to food and feed crops for local use, now contributes such specialties as citrus fruits and early vegetables to international trade.

The Mediterranean Region long has enjoyed commercial advantages dependent on its mild winters and sunny summers, together with proximity to the manufacturing countries beyond the Alps; but change is common in world commerce. Australia, Chile, and South Africa, as well as California, contain areas with climates of the Mediterranean type, and to these areas Mediterranean crops and agricultural methods have spread. Improvements in transportation have reduced the handicap of distance, and in some instances (notably in Australia's raisin shipments to Britain) preferential treatment of colonial products enables the distant producer to undersell his Mediterranean competitor. On the other hand, greater speed in transportation permits the Mediterranean grower to ship commodities of a more readily perishable nature, thus engaging in a branch of trade where distance still has much significance. Agriculture on irrigated tracts is readjusted accordingly, but the problems of the *secano* land remain unsolved. In nearly all cases the crops that furnish the perishable fresh fruits and vegetables of world trade are unsuited to *secano* agriculture.

The efforts of individuals and groups to save the Málaga raisin industry are typical of what is happening in many places and in many industries. The national government regulates the quality of the export product, Málaga growers having asked for that service in order to gain the competing strength that standardized quality gives in world markets. Standardization without government aid and inspection had proved impracticable because of the large number of independent growers. Government regulations require fair weight and a uniform quality in harmony with the shipping mark on the package. To gain the desired uniformity, sorting begins in the vineyards when the grapes are picked and is repeated with each operation of the curing season. In order that the raisins of each individual stem may be of uniform size, one process of sorting takes place while the fruit is on the drying floors. Men cut off the grapes that differ in size from their neighbors, the loose raisins being sold in bulk. Further sorting takes place in the packing-houses. To compensate in some degree for the unavoidable loss of foreign markets, the raisin-growers a few years ago launched a campaign to increase sales in domestic markets. Widespread advertising urged the Spanish people to show their loyalty by eating more home-grown fruit. The project seemed to be accomplishing something when the outbreak of war paralyzed Spanish commerce.

# HOW THE CURRICULUM GROWS: THE STUDY OF COCOA, AN EXAMPLE

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In order to determine whether any school enterprise will be practical, desirable, socially useful, and meet the needs of children in any grade, one must know children and the needs of society. Each situation is different from any other because not only the needs and interests of children vary, but no two environments are precisely alike. There are, however, educational principles that should operate in every classroom.

In the first place, it is of primary importance for the teacher to know the interests, needs, and outstanding characteristics of the group. In addition to this knowledge, she should know the individual needs, interests, and abilities in order that no child is submerged in the group.

One of the outstanding social needs of most children is the development of unselfishness, and tolerance. Many of them know little of the people outside of their own social world. They need to be kept busy doing worthwhile things for their own group, learning to appreciate what others are doing for them, and, if possible, finding some way of bringing joy to those less fortunate than themselves.

The curriculum should be a growing thing rather than a predetermined mass of facts to be imposed upon children. As an example is always more convincing than exhortation, an attempt will be made to show how a series of worthwhile activities grew out of making a cup of cocoa.

Before school opened in the fall, the teacher was told that the fourth grade (both boys and girls) would have cooking that year. She felt that the children's interest in cooking could be utilized and stimulated in such a way that activities developing initiative and requiring needed knowledge, skills, attitudes, and appreciations would result.

The following account of the growth of the work, given mainly in outline form, is in the order of its development.

## THE STUDY OF COCOA

A. How the study began

The fourth grade were enthusiastic about their first cooking

lesson. They had made cocoa and wanted to talk about it. When their teacher asked who had made it possible for them to make cocoa, they replied immediately, "Our cooking teacher." They were questioned further, and finally one little girl said, "I don't think we could have made cocoa if some one had not raised the cocoa, that is if cocoa grows. Does cocoa grow on a tree or a bush, or is it made in a factory?" As no one in the class could answer that question, it was decided to find out. The next day the daughter of a manufacturer of candy and cocoa told the class that her father would be very glad to have them visit his factory and to "see how cocoa is made." The class was most enthusiastic and eager to go at once.

B. Preparation for the trip

In as much as machinery in factories is noisy, complicated and confusing to many adults, it was necessary for the teacher to plan very carefully in order to make the trip educative for the children. The type of guide is of paramount importance, for little children must be given time to observe, ask questions and to assimilate what they see and hear. Hence, a whole day was planned for the trip to the factory.

1. Studying an illustrated pamphlet of factory (every child was given one) to make the trip more meaningful.
   a. Learning some of the main processes in making cocoa
   b. Looking at pictures of the machines which perform these processes in order to recognize them when seen
2. Planning the trip
   a. Discussing ways of transporting class to factory
   b. Figuring the number of cars needed
   c. Discussing the importance of courtesy and self-control on trip
      (1) What are some of the things we can do in order to show courtesy to our drivers, to each other, to our guide, and others?
      (2) Why might it be dangerous to distract a driver's attention?
      (3) Why do we have red lights and policemen at some intersections?
      (4) Why it is dangerous to go near a belt on a machine?

C. The visit to the factory

1. Going thru the main departments of the manufacturing buildings. (The guide was a man who loved children and could

speak their language. Before entering each department he told them simply about some of the processes they would see. On entering each department those processes were pointed out to the children, who were then given time to look around and ask questions. After luncheon, the guide met the children in one of the large office rooms where they had a better chance, away from the hum of the machinery, to raise questions and listen to the guide's answers.)

2. Learning the difference between cocoa and chocolate
3. Learning the difference between sweet chocolate and bitter chocolate
4. Learning why everything in the factory must be sanitary
5. Eating lunch in the cafeteria of the Service Building

D. Discussing the trip with the guide and later with the teacher, and raising questions concerning observations or interests stimulated such as:

1. Where did the cocoa beans in the factory come from?
2. Why don't the farmers near Milwaukee raise cocoa beans for the factory?
3. What does the cocoa tree look like?
4. Do cocoa beans grow on the branches of trees or are they the seeds of a fruit such as a peach or a plum?
5. Do people who raise cocoa beans do anything else for a living?
6. How did people find out that you could make cocoa from cocoa beans?
7. Why do some people speak of cocoa beans and others speak of cacao beans?
8. Do the factory people like their work? Do they get tired of doing the same thing all day? How long do they work each day?
9. What are some of the things that are being done in the factory to make life a little pleasanter for the laborers?

E. The method of answering the questions raised by the children

1. Listing questions
2. Determining the questions which the class as a whole were interested in solving—assigning others to committees or individuals
3. Assembling materials and reading to answer the questions
4. Group discussions (evaluating and checking statements)

5. Securing necessary information from the manager of the plant such as: Does the factory sell all of its candy to Milwaukee people?

   Why does the factory buy more cocoa beans from Venezuela when there are more grown in Brazil and also large quantities in Ecuador?
6. Using the map and globe to locate any place mentioned
7. Tracing routes on a map or a globe
   a. Studying factory's map showing the distribution of candy
   b. Tracing route of cocoa beans from their source to factory and computing the distance traveled

F. Activities that grew out of the trip

1. Writing letter of appreciation to the following people
   a. The owner of the plant for inviting us to go thru the factory and giving us candy and luncheon
   b. The manager for making arrangements for our trip and sending each one an illustrated pamphlet of factory
   c. The guide for taking us thru the factory and explaining the different processes viewed and answering many questions
   d. The manager of the cafeteria for arranging the luncheon for us
   e. The cooks for making our cocoa, sandwiches, and dessert
2. Writing articles for the *Normal News* (a monthly school paper)
   a. A brief account of our trip
   b. An original story called "The Adventures of a Cocoa Bean"
3. Writing invitations to parents and friends to the Assembly Program
4. Working problems related to the candy industry, such as
   a. Jane wanted to know how many cocoa beans are used in making a five cent bar of milk chocolate. The guide told her about five. According to our guide how many beans will be required to make a bar for every child in the class? Weigh five cocoa beans. Does it take more or less than five cocoa beans to make one ounce?
   b. Weigh a bar of milk chocolate. How many ounces does it weigh? (How many ounces in a pound?) Why does the bar weigh more than five cocoa beans weigh?

c. How many pounds of candy did our guide tell us that the factory can make in one day? How much would that be in a week?

5. Raising and solving problems about some of the people responsible for the production of cocoa beans such as
   a. Why are some of the houses in Ecuador and Venezuela built on poles? How can the children get out of the houses to go to school?
   b. Do all people in these countries make their living growing cocoa beans? If not, what else do they do?
6. Deciding to give an Assembly Program
   a. Preparing the program
      (1) Deciding the subjects of the talks and the length of each
      (2) Making charts and diagrams to illustrate talks
      (3) Making a cocoa exhibit to make the talks more concrete
         (a) A cocoa pod
         (b) Cocoa beans from Africa and from Venezuela
         (c) Samples of cocoa in different stages of preparation
7. Giving the Assembly Program

   (A pupil chairman presided and announced the talks)

   a. Why the fourth grade visited a candy factory
   b. How the cocoa in this can was made from beans like this
   c. Why cocoa is a better beverage for children than chocolate
   d. How the centers of cream chocolates are made and coated
   e. How the name is put on the chocolate bar
   f. How taffy is made and pulled in a factory
   g. How carmels are made and wrapped
   k. How the peanut butter gets into the center of hard candy
   i. How eggs are decorated in the Easter egg department
   j. How the factory gets cocoa beans
   k. How cocoa beans are raised (illustrated by a painting showing pods growing on trunk of tree)
   l. How natives prepare cocoa beans for market
   m. Betty's party (The class called the luncheon in the cafeteria "Betty's party")

The writer hopes that this article not only affords an example of what can be done but may suggest similar activities that can be carried out in any classroom. Of course, there are as many different ways of developing this work as there are groups of children.

# THE FUTURE OF MANCHURIAN AGRICULTURE

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Several articles during the past few years have furnished a rather adequate picture of Manchuria's most important economic activity—its agriculture. The present status of the industry and its adjustments to the surrounding natural, economic, and cultural environment have been treated by several authorities.[1] But what of the future? How will Manchurian agriculture accommodate itself to the ever-changing panoramic background in the years to come?

Prediction is a hazardous task in all cases, but forecasts concerning Manchuria are particularly risky. Lack of complete and accurate information relative to the country, the dynamic political situation that exists in the Far East, the economic revolution that is in progress there, . . . all these factors make the task of the oracle extremely difficult. Nevertheless, and despite these obstacles, several generalizations regarding future trends of agriculture in Manchuria may be made.

## FUTURE WORLD IMPORTANCE OF MANCHURIAN AGRICULTURE

In the present world set-up, the agricultural importance of Manchuria is relatively minor. Total production is small in comparison with the huge outputs of such countries as India, China Proper, Russia and the United States. Even the relatively small nations of Germany, France, Italy and Japan equal or exceed Manchuria in their production of crops. But the possibilities for future expansion of agriculture are greater in Manchuria than in many of the nations of the world. There is much arable land remaining in North Manchuria that will be rapidly and thoroly colonized in the years to come. Such potentialities do not exist thruout the world. In many nations, the approximate capacity of the land to produce (under existing conditions) has been reached. On the other hand, with ample room to expand and with the necessary increase

[1] It is suggested that the reader review one or more of the following before reading this article:

J. R. Stewart. Manchuria: The Land and Its Economy, *Economic Geography*, Vol. 8, 1932.

J. R. Stewart. The Resources of Manchuria, JOURNAL OF GEOGRAPHY, Vol. 31, 1932.

D. Christie. Manchuria Half A Century Ago and Today, *Scottish Geographical Magazine*, Vol. 46, 1930.

G. Vidal, La Mandchourie, *Geographie*, Vol. 56, 1931.

in population to cause the expansion, agricultural production in Manchuria should increase. Consequently, the world status of that nation as a producer of farm commodities should advance in the future.

### RATE OF EXPANSION TO DECLINE

Another prediction can be made with a fair degree of certainty. While agricultural production in Manchuria will certainly increase in future years, the advancement will be at a constantly decreasing rate. Excluding several areas (the Lower Sungari region, for instance), the best cultivable land of the country has already been appropriated and is producing crops. The cream of Manchuria's land has already been skimmed (Fig. 1). In the future, increased agricultural production will result from the utilization of the less desirable and less productive arable lands, together with the division of the larger and more extensively exploited farms, the use of better agricultural methods, and the reclamation of waste lands. Future agricultural expansion in Manchuria will, therefore, be less and less significant as poorer areas are opened for settlement. Consequently the agricultural production of the country will grow at a diminishing rate.

### AGRICULTURE TO BECOME LESS SIGNIFICANT

From the above prediction a third trend can be foretold. While the best of the agricultral resources of Manchuria have already been utilized, many of its other natural resources, its mineral wealth and its forests, have remained almost untouched up to the present. The Mountains of eastern Manchuria contain some of the finest timber in the Far East, and altho sizeable tracts near the railroads and rivers have already been cut over, a tremendous amount of timber still remains. The Khingan Mountains, both Great and Little, support large tracts of thick and uncut forest. Deposits of coal and iron ore, found in both North and South Manchuria, are as yet relatively unutilized, while possibilities for the future discovery of other mineral deposits in the almost unexplored portions of North Manchuria are bright. Gold along the tributaries of the Amur River merely awaits the presence of more settled conditions and the entrance of sufficient capital in order to become of considerable importance. Here, then, are immense reserves of virgin natural wealth that will most certainly become highly exploited in the future. In contrast, the increase in the agricultural wealth of the country has already reached a peak, and future development will

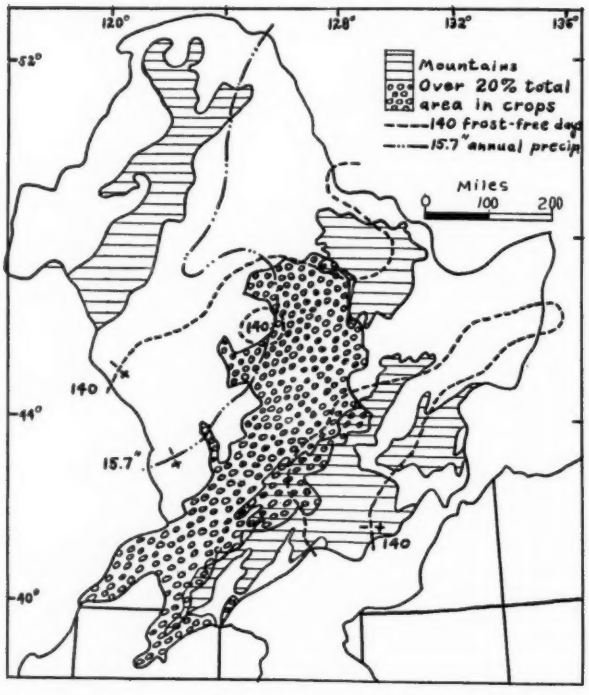


FIG. 1. Sketch map showing natural environmental restrictions to extensive agricultural utilization of the land in Manchuria. Source: Modified from maps by Murakoshi and Trewartha, "Land Utilization Maps of Manchuria." *Geographical Review,* Vol. 20, 1930.

Limits to the extensive agricultural utilization of land in Manchuria are manifold in number and diverse in character. That part of the country devoting over 20 per cent of the total land to crops is hemmed in to a large extent by an unfavorable natural environment, altho other factors such as isolation are also important.

Along the southeastern boundary, the unfavorable topography of the Changpai Range retards extensive farming. Farther north, along the central portion of the eastern boundary, a shortened growing season (resulting from both increasing latitude and altitude) together with increasing relief offer small possibilities for crop production.

Natural environmental limits to land utilization have not been reached in the northeast. The land there favors agriculture. The greatest present hindrance to cultivation is its isolated nature with reference to the historical routes of Chinese penetration. This Lower Sungari region is, in the future, destined to be the zone of greatest attraction for the Chinese immigrants from Shantung and the south.

In the north, topographic limits presented by the Little Khingans, together with a relatively short frost-free season, prevent extensive agricultural pursuits.

The western boundary bisects the Manchurian Central Plain; hence relief is not the limiting factor. Thruout most of its length, the boundary is determined by a lack of adequate precipitation, which is insufficient for crop growth in many years, and by a coexistent alkaline and sandy soil (partly a result of the meager rainfall).

become less and less significant. The relative importance of agriculture in the ecnomic life of Manchuria, therefore, will decrease in coming years. Instead of accounting for almost three-fourths of the productive ability of the country, as it does today, the significance of agriculture will constantly diminish.

### FUTURE CENTER OF AGRICULTURAL EXPANSION

While the best of Manchuria's arable land has already been taken, one large area in the country still remains in which agricultural conditions are exceptionally favorable. There the agricultural potentialities have scarcely been touched. It can be safely predicted that this region, the Lower Sungari zone, will experience the greatest boom in agriculture of any portion of the country in coming years. Most of the remaining unsettled portions of Manchuria have one or more natural environmental factors, such as poor soil and scanty precipitation, that are unfavorable to agricultural production. The Lower Sungari region apparently has no such disadvantageous aspect (Fig. 1). Until recent years, relative isolation and the unsettled political situation has retarded its intensive settlement. With the better lands of the more accessible portions of Manchuria well colonized (in many cases almost fully occupied) and with increasing extension of transportation facilities the development of the Lower Sungari region is progressing. That region is now one of the most rapidly advancing agricultural areas in the country, and in the future it will become increasingly important.[2] It is the coming "boom" area of agricultural Manchuria.

### DOMINANCE OF CHINESE IN AGRICULTURE

Just as the marvelous development of Manchuria's agriculture in the past has been chiefly dependent upon the Chinese population of the country, so does the future of the industry also appear to rest with the Chinese. For over a century the Chinese element has been dominant in Manchuria. The rapid colonization of barren tracts and their conversion into productive farmlands has been chiefly the work of the settlers from the south. In the future this condition will not be materially changed. The Chinese will continue to dominate the agricultural industry of Manchuria. Greater competition, however, will probably be offered in coming years by an increased Korean population. The Koreans, since their standard of living is

[2] See the article by C. W. Young, Chinese Colonization and the Development of Manchuria, *Problems of the Pacific*, 1929.

even lower than that of the Chinese, are the only people able to compete seriously with the Chinese farmer.[3] Now that the Japanese have come into indirect control of Manchuria, the former major obstacles to the rapid infiltration of Koreans into the country (the inability to own or lease land, and the oppression by Chinese authorities) will probably be removed. Consequently, in the future, an increasingly large number of Koreans will undoubtedly cross the border into Manchuria, where they will become an important element in the agricultural population of the country. Contrary to the Koreans, it appears extremely unlikely that large Japanese emigration to rural Manchuria will develop. Despite the recent removal of the land-leasing obstacle, other and equally as potent impediments continue to restrict the movement of Japanese farmers to the country. In the first place, they are distinctly a home-loving people, and prefer the intensive cultivation of their native land to the settlement of foreign countries. Then, too, they apparently do not thrive in a cold climate such as most of Manchuria possesses, particularly the northern regions still open to settlement. Witness the relatively sparse population of their own "north-land" island, Hokkaido, even today. Probably the most important factor, however, is the difference in the standards of living of the Japanese and the Chinese. That of the former is higher. Just as the Japanese farmer would drive out the American in California, if permitted, so does the Chinese expell the island-farmer from Manchuria. Agricultural colonization by other nations, including Russia, will continue to be as conspicuous for its absence as it is today. The agriculture of the future in Manchuria will, therefore, be dominated by the Chinese and the Koreans.

### NORTH MANCHURIA TO BECOME A LAND OF HOE AND SPADE

Farming in Manchuria, while more "extensive" than that which characterizes China Proper, is notoriously "intensive" in comparison with that so prevalent in the United States. Few agricultural machines are to be found in the country, the holdings are small, and the dominant reliance is still upon the farmers' own muscles. But much of Manchuria is preëminently suited to a large-scale ma-

[3] "Along the borders of Korea, hundreds of thousands of Koreans have come across into China (i.e., Manchuria) and by their low standards of living are displacing the Chinese. . . . This is the only example in China, and probably anywhere in the world, of a race which is able to complete with the Chinese and win out." G. B. Cressey. *China's Geographic Foundations*. p. 243. McGraw-Hill, N.Y.

chine type of agriculture. Immense contiguous tracts of level land in the Manchurian Central Plain invite the use of the gang plow, the binder, and the reaper. Parts of South Manchuria are already too densely settled and the land is divided into too many small plots to permit a shift to an extensive farming regime. Large tracts of virgin land, however, are still to be found in the north. Will these potential farm lands assume the characteristic "garden" aspect of China Proper in the future or will they become, rather, like the prairie lands of North America which they so much resemble, the home of a mechanized agricultural economy? All available signs point to the extension of South Manchurian conditions into the present unexploited regions of North Manchuria. The uneducated, conservative Chinese farmer, apparently resigned to his present fate, seems incapable of taking advantage of the propitious conditions that nature has provided. In the undeveloped lands to the north, where pressure of population on the land does not throttle all attempts at advancement, the possibilities for economic development are present, but conditions apparently will make all such efforts abortive. The lack of cooperation among the intensely individualistic Chinese farmers, their extreme conservatism, the excessive taxation, the possession of the land in large tracts by absentee landowners, and other factors all work together to prevent such an economic revolution. North Manchuria, like South Manchuria, appears destined to a reign of small farms, populated by beggared farmers, and tilled by the sweat of their brows.

### TENANTRY TO INCREASE

Other trends in the agriculture of Manchuria can be foreseen. The amount of tenantry in the country, while large at present, will continue to increase in the future, unless unpredictable developments occur. The divisional process, whereby originally large farms are broken up and equally divided among male offspring, eventually results in decreasing the size of the individual farms to a point where either the holdings must be relinquished or additional land rented. In either case, the status of the farmer is changed from that of a free-holder to that of a tenant. This process has been going on for generations in parts of Manchuria, and has contributed in a marked degree to the large proportion of tenants already found in this so-called "pioneer" land. That such a procedure will continue in the future is almost inevitable, and if it does the future land-

tenure situation in Manchuria can only become the more aggravated.

### SLIGHT SHIFT IN MAJOR CROPS

The major crops of Manchuria in the future will probably remain the same as they are today, namely soya beans, kaoliang, millet, maize and wheat. With the settlement of the now unused farm lands of northern and western Manchuria, however, the emphasis upon the individual crops should shift. Soya beans, millet, and wheat are able to survive the decreasing rainfall and shorter growing season found in these areas of future expansion; kaoliang and

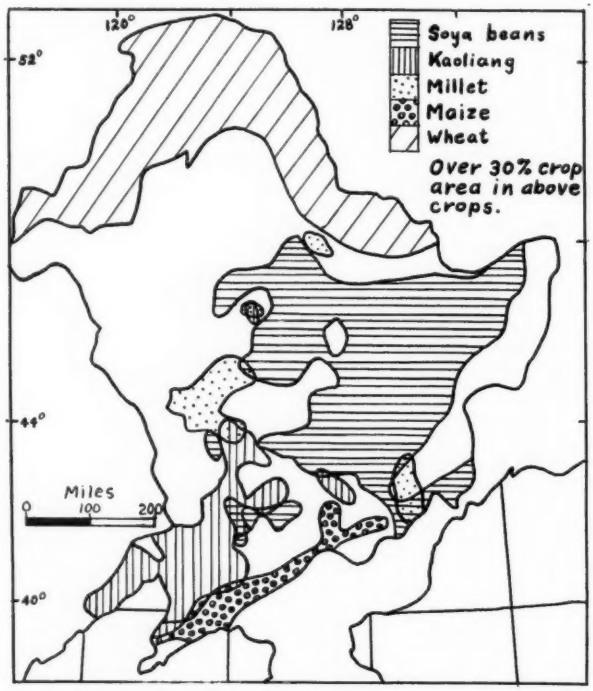


FIG. 2. Sketch map showing the distribution of dominant crops in Manchuria. Source: Modified from maps by Murakoshi and Trewartha, "Land Utilization Maps of Manchuria." *Geographical Review,* Vol. 20, 1930.

The present distribution of the major crops in Manchuria will give some clue as to future changes in their relative importance. Notice how kaoliang and maize are relatively most important in South Manchuria, where more abundant precipitation and a longer growing season are found. Then notice how the soya bean, millet, and wheat are relatively most important in North Manchuria, where a smaller annual precipitation and a shorter growing season prevail. Most of Manchuria's remaining unoccupied farm land is in North Manchuria. As this land becomes occupied, which group of crops should increase in importance?

maize are adversely affected. Consequently, as the agricultural growth of Manchuria continues, the importance of the former three crops should increase relative to the latter two[4] (Fig. 2). Paddy-rice production, while insignificant at the present time, should advance as the Korean element in the farming population becomes more prominent, altho Manchuria will never become a major producer of that commodity. Cotton likewise will never become a major crop in Manchuria, and as a world producer that country will continue to remain insignificant. Cotton is limited, and will remain limited, to a small area in South Manchuria, which is the only part of the country that affords anything approaching a suitable environment for the crop.

## SUMMARY

Viewing the situation in Manchuria as a whole, it appears certain that the agriculture of the country will have a great future. Nature has provided it with a wealth of natural resources, a fertile soil, a stimulating and productive climate, and an abundance of land which an energetic people are industriously striving to develop. But just how important the future will be and what trends it will take depend to a large extent upon the people who are settling there. Will the coming years herald the rise of a superior agricultural development, or will they merely record the transplanting of the old Chinese culture to this new region? "Are these incoming farmers the pioneers of a new civilization which will set fresh standards of human happiness and progress?"[5] As far as present trends indicate, such is not the case. The bulk of the immigrants who find their way to Manchuria are the conservative, tradition-bound, impoverished Chinese peasants. With these tools Manchuria can scarcely be expected to develop a superior culture. The nation seems destined to expand economically, but not to advance.

[4] There is some doubt as to the future expansion of wheat cultivation in Manchuria, as the environment of the country is not particularly favorable to its growth, while the quality of the wheat is inferior to the foreign product.

[5] G. B. Cressey. China's Geographic Foundations, p. 233. McGraw-Hill, N.Y.

# GEOGRAPHY FIELD WORK IN THE SMALL CITY

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As a result of the growing idea that a study of urban centers is a phase of geography, the possibilities of field work in this direction are becoming more and more apparent. At the same time, an attempt is being made to dispel the idea that such field work can be done only in large cities where a complexity of residential, industrial, and business patterns is to be found. That geography field work at upper grade level may be very effectively carried out in the small city, as well as the large, is illustrated by the following experiment which was undertaken in Cape Girardeau, Mo., a town of 16,227 inhabitants.*

## PROCEDURE

The exercise actually occupied only five hours of the school schedule—one hour the first day, three the second, and one the third day. The class period on the first day was given over to a study of the patterns of several large cities for which simple maps or drawings were available. The purpose of such work was to introduce the pupils to the similarities in the general plans of cities and the relation of the residential areas to the business and industrial sections. In some cases reasons for the locations of these districts were easily seen and commented upon. For example, each student saw how and why the business section usually occupied a central position, and how poor homes were more often adjacent to industrial areas than were fine homes. When such relationships as these were pointed out for large cities, then the students were told that the next day the class would take a trip thru parts of their own town in order to find out whether their city resembled these larger ones.

The following day three hours were allowed for the trip itself. Since three cars were used and the pupils would necessarily be separated, the teacher gave the class definite instructions as to how they were to work and what they were to observe. These instructions included the following:

1. You will need only a stiff-backed notebook, pencil, and the mimeographed map of the main city streets with which each of you has been provided.

* This field experiment was made by the seventh grade geography class of the College Demonstration School.

2. As the trip progresses mark the route on your map and indicate thru what type of area the class travels, that is, residential (poor, middle, or high class), business, or manufacturing.
3. The teacher will take pictures at certain places. These points must be marked on your map with the proper number of the picture. Any notes are to be recorded on the back of the map.
4. In some cases stops will be made tho not long enough for all of the students to get out. Pupils will leave the car only when the teacher gives the signal.

### THE FIELD TRIP

As the excursion was planned each important section of the town was visited, some sections more thoroly than others. From the upper middle class residential areas near the school the route traversed the largest of the middle class type in the city and went on to the business section. After following the business district rather closely for several blocks the party left it, proceeded thru low middle class, then poor residential areas, and came finally to the manufacturing district south of the city. At this point the cement company is located in a large field beside the Mississippi River. Here the loading of cement and crushed rock onto river barges offered an opportunity to point out the use and importance of the river. Later, the lumber mills in the same part of town furnished a chance to emphasize the value of the river for certain kinds of transportation. From the southern end of Cape Girardeau to the northern part, the class moved from manufacturing into residential areas, then back into the business district, out of it to the vicinity of the poor residences again, and came at last upon the northside shoe factory district. Here such features as the importance of the railroad facilities and the particular types of homes were noted. The last part of the trip was again thru an area of better middle class homes surrounding the school.

### GENERALIZATIONS

The day after the field excursion the class period was given over to two things: (1) making a large diagrammatic map of the town and (2) drawing generalized conclusions as to the city's pattern. The large map was made on a piece of poster board on which the same outline of the city streets had been drawn as was mimeographed on the smaller student maps. This poster board was taped to the blackboard and colored pencils were used to designate the important sections. The students' maps (which they kept before them on their desks) differed of course as to details, but the large class map represented a generalization of their findings. As the

map progressed the students found that five types of districts stand out: (1) business, (2) manufacturing, (3) poor residential, (4) low middle class residential, and (5) middle class residential dotted with high middle class homes. When these were marked out then the pictures which had been taken were pasted along the edge of the map and connected with their proper areas. For instance, a

Lower Class Homes

Middle Class Homes

High Class Homes

colored string was stretched from the picture of the cement plant to the point in the manufacturing area at which the plant is located, and a picture of better class homes was connected with its location in the residential area.

When the class map was completed a discussion followed which was directed toward a simple interpretation of the pattern. Such generalizations as the following were made:

1. The business streets form a central area about which middle class houses are usually found.
2. The manufacturing and part of the business section border the river, along which the railroad runs.
3. The poorest homes are nearest to the factory districts.
4. The low middle class homes form a belt between the poor and middle class homes.
5. The middle and high middle class homes spread out on higher ground to the west, away from the river. In no case do they border the manufacturing districts.
6. The factories turning out or using heavy materials make use of river barges.
7. Manufacturing plants which require much room are found south of the city where land is plentiful and cheap.

Reference to the population and work patterns which the class had already found to be characteristic of large cities was then made. The plan of Cape Girardeau was found to compare in most instances with those of larger places, and reasons for the home plan were found to be much like those for the patterns of other cities.

In this account of an experiment in geography for the upper grades an attempt is made to show how a small city may present opportunities for field work. These may prove themselves to be as interesting as they are instructive. It is certainly not necessary for schools, other than those in large city systems, to look upon a first hand study of urban patterns as impossible.

# CELERY GROWING IN THE UNITED STATES

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There are few hotels, restaurants, or dining cars in which celery does not appear on the menu card. Cooked or raw, celery is being served in homes with greater frequency. Its use has rapidly increased during the past two decades. In the United States in 1918 only 14,000 acres were given over to celery cultivation. During the next eleven years the acreage more than doubled, reaching in 1929 a total of 28,770 acres. Three years later, in 1932, production reached the peak of 35,000 acres. The growth of popularity revealed by this increase in acreage may be traced to improvement in quality and variety. The greater demand also led to improved methods of handling as well as to the extension of the industry to new regions, especially to California, where celery is a year-round crop.

## HISTORY

What has been the history of this plant? It is a native plant of marshy places from Sweden south to Algeria, Egypt, Ethiopia, and to the Caucasus Mountains. This wild celery, or "smallage" as it is known, has a bitter flavor and a pungent odor. The French began its cultivation in 1623; however, the early cultivated celery differed very little from the wild form, being more or less hollow stemmed. Originally the plant was not blanched, nor was it eaten raw, for uncooked it was poisonous. Its sole use was for flavoring soups and stews. Later celery was discovered to have certain medicinal value. The seed was sold into England in 1776, and the English were the first to blanch celery. This was found to improve the flavor and produce a wholesome vegetable.

Celery appears to have been introduced into this country from England before the middle of the nineteenth century. There is evidence of its having been grown near Kalamazoo, Michigan, as early as 1855 when an employee of the Kalamazoo State Insane Asylum discovered that he could raise celery successfully. It was used at the Asylum for a number of years before the vegetable's commercial possibilities were realized. The founders of the industry were Holland-American gardeners near Kalamazoo. These men did not know celery and its uses prior to settling in that locality, however, they were raising it for commercial purposes by 1874.

The problem of educating people to eat celery and of creating a demand for the product was met by offering it for sale to passengers on trains passing thru Kalamazoo. Later the newsboys on the Michigan Central Railroad trains sold celery to passengers on trains and to people along the route. The visitor to Kalamazoo, whether by auto or train, is still met by numerous boys selling celery along the highway and at railway stations.

The industry has spread now until in 1930 California had 9,336 acres devoted to celery; Michigan ranked second with 5,859 acres; Florida was a close third with 5,420 acres; while New York followed with 5,123 acres. Every state has at least a few acres in celery. The largest increase in acreage planted in recent years has been in Florida and California. Utah and Idaho have surprised the market recently by appearing as growers. They were not listed before 1928, but in 1930 Idaho had 127 acres and Utah had 446 acres. Utah has even produced a variety of celery that is stringless.

## PHYSICAL REQUIREMENTS

Celery may be grown where there is an abundance of moisture either from rain or from irrigation. The growing season should be relatively cool. Celery does best when the nights are cool and the days bright with sunshine.

The soil used may be muck as in the Great Lakes area, delta land as near the mouth of the Sacramento and San Joaquin rivers in California, sandy as in Florida and southern California, or a light sandy loam as in New Jersey and Long Island. In other words, nearly any type of soil will do, but it must be well-drained, deep, and of a somewhat loose texture. Altho naturally a marsh plant, cultivated celery will not grow satisfactorily on a wet soil or on a soil where the water table is kept near the surface. The soil should contain plenty of available plant food, but since celery is a rank feeder, it does not pay to grow it without using large quantities of manure or commercial fertilizers.

## THE SEED

There are many problems connected with celery growing, but one of the greatest is getting good seed. As a leading New York grower has stated, "The first essential to growing a good crop of celery is to secure good seed of a desirable strain." Many growers buy their seed a year in advance and plant a small quantity to test the purity and the trueness to strain and type. Before 1915, most

of our celery seed came from Europe, especially France and Italy. The World War forced American seedsmen and seed growers to produce celery seed in this country. Changes and improvements in varieties resulted. The methods of raising the seed have been more careful than those of European growers, so a better grade and quality of seed are now available. High grade seeds are now produced in both the East and the West.

### Planting

The plants are started in greenhouses or hotbeds where they stay for about two months. At this time the temperature needs to be carefully regulated, for the plants will go to seed if too cold. After two months they are transplanted into fields that have been carefully leveled, drained, or where necessary, provided with irrigation ditches. This transplanting, when done entirely by hand with trowels, usually requires a gang of twelve or thirteen men, boys, or women. A typical Florida gang includes four women to pull and sort plants, four boys to drop the plants ahead of setters, two men to set the plants, two men to water the plants, and one extra man to keep the work going.

Machines for planting the celery have been introduced. Here the plants are fed into the machine which automatically opens a furrow, places the plant, and closes the furrow. Some machines have a means of injecting water around the roots. The machine only partially solves the labor problem, for a crew of seven or eight persons is still required: two or three at the seedbeds, one to take the plants to the field, at least one man and two boys to operate the machine, and someone to keep the machine supplied with water.

The plants stay in the field about 120 days before they are ready for harvesting. During this time frequent cultivation takes place. Care is exercised to let no disease or insects invade the field.

### Blanching

The final step in preparing celery for market is blanching. This is done to improve the flavor, crispness, and tenderness in the stalks by destroying the green coloring matter and reducing the amount of fibrous tissue. Originally earth banked against the plants was the sole method. Boards succeeded earth, but in some sections lumber is too expensive. Many growers now use strips of specially prepared paper. Colorado farmers sometimes blanch late crops by

wrapping the individual plants in newspapers. Experiments have been conducted using ethylene gas for blanching, but this has not been very successful. The gas not only blanches the stalks but also

FIG. 1. Blanching by means of earth.

removes the color from the leaves making the celery appear old, thus lowering its value on the market.

Some self-blanching varieties have been developed. The plants

FIG. 2. Blanching by means of boards.

are placed close together so the celery foliage will exclude enough light to cause the stems to blanch sufficiently to meet market requirements. These varieties are used only where the crop is marketed directly from the field and is not to be stored.

## MARKETING

Harvesting requires a crew of twelve or thirteen persons for removing boards or paper, cutting, trimming, and packing. The celery may then be marketed immediately or stored for later sale.

Eastern celery is on the market from June to January; Florida celery is found from January to June. California markets some every month, but the peak is reached from November to March. California is able to compete successfully in eastern markets because its growers are more careful of quality than are the eastern growers.

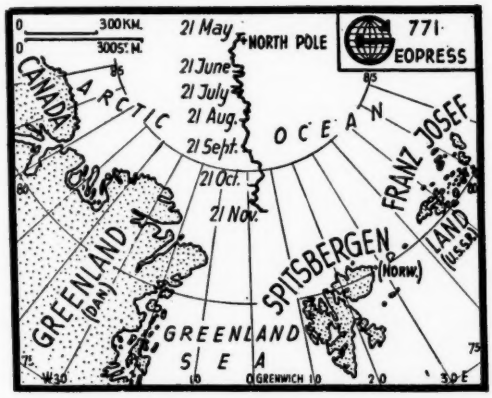
Celery is probably the most expensive of all vegetable crops to grow because of the demand for special equipment for planting and harvesting, the heavy consumption of fertilizers, the need for the best seed, the large supply of labor that is necessary. This means that the farmer must be sure of his market before he enters the industry.

## FUTURE

The future of the industry does not appear to be one of expansion. In some areas there is a decreasing yield per acre with an increasing acreage planted. Diseases are becoming more common and destructive. Many growers have not enough barn yard manure for fertilization. But these problems are being met and solved. A lack of adequate markets seems to be the only hindrance to further expansion of the industry. At present the saturation point in the celery industry appears reached.

# EDITORIAL NOTES AND NEWS

On November 21, the four Soviet explorers had been six months on the ice floe. Last spring they set up camp near the North Pole. Since then the icefield on which they are located has drifted towards the south as indicated on the attached map. Up to the present time, the drifting icefield has followed a zigzag course of about 625 miles. This southerly drift appears to be opposed to the theory of a circular flow of water around the North Pole. The party has kept in contact with the outside world by radio.

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DR. SIDMAN P. POOLE will head an expedition from the Natural Science Museum, Syracuse University, to study the Maya country of Yucatan. The party will sail from New Orleans, January 7, and will spend about two months in the field, giving particular attention to geographical and geological relationships underlying the Maya civilization. It is hoped to have the material collected by the expedition, ready for use in the Museum by the spring of 1938. Other members of the party will consist of Robert Crockett, physician and botanist; Frederick Foster, photographer; and Joseph Kozlowski, artist.

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The Pan American Union announces a new two reel motion picture film, "Rollin' Down To Mexico," for use in either a 16 mm. or 35 mm. sound projection. The film records a trip over the Pan American Highway from Laredo to Mexico City, with visits to a number of cities adjoining the capital. Several other films are available to schools and study groups, thru the loan service of the Union, at transportation costs both ways.

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The Association of American Railroads has prepared an annotated bibliography, Railway Guide for Young People, listing 150 books, booklets and periodicals covering every subject relating to railway transportation, past and present. It is available free to teachers and librarians from the Association of American Railroads, Washington, D.C.

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DR. GUY-HAROLD SMITH, Chairman of the Department of Geography, Ohio State University, announces the appointment of Webster McBryde of the University of California as full time instructor in geography at Ohio State. Six hundred and six students were enrolled in the fall course in the Principles of Geography. During the college year 1936-37, there were 2408 registrations in geography courses.

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The New York Geographical Association held its fall meeting at Cortland Normal. During the morning session papers were read by T. E. La Mont (Cornell), William M. Hillegas (Cortland), Olive Fish (Cortland), R. S. Beck (Cornell), Katheryne Whittemore (Buffalo), A. T. Root (Rochester), J. Cayce Morrison (Assistant Commissioner for Elementary Education, N.Y.), and O. D. Von Engeln (Cornell). During the afternoon a field trip thru sample areas of each of the major land classes provided illustrations of various types of land use. At the evening dinner, Dr. George B. Cressey (Syracuse) addressed the group on, A Geographer's Summer in the U.S.S.R.

The Boston Association of Geography will sponsor three meetings and publish four bulletins during the present school year. Mr. James H. Powers, Foreign Editor of the *Boston Globe*, was the fall guest speaker. The fall bulletin features a geographic study of the region traversed along the Mohawk Trail and its extension to Boston, contributed by Mary T. O'Connell, president of this active association.

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MABEL WASHBURN, Shortridge High School, Indianapolis, attended the meetings of the World Federation of Education Associations which met in Tokyo in August.

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The Institute of Far Eastern Studies, held at the University of Michigan during the summer of 1937 was a response to the rapidly growing interest in the Far East and an outgrowth of a long association between the University of Michigan and the peoples and governments of the Far East. The primary purposes were to promote understanding of the Far East and to offer language instruction designed to give a reading knowledge for the promotion of research. Thru the Institute of Pacific Relations the Chinese Language School offered a concentration course in modern Chinese; partially thru aid granted by the American Council of Learned Societies the Japanese Language School conducted a similar concentration course. Russian language was offered at both elementary and advanced levls. Nineteen courses, including four in geography, pertained to the civilizations of the Far East. Professor Samuel Van Valkenburg of Clark University offered courses on Farther India and the East Indian Islands. Professor Robert B. Hall, Director of the Institute, offered courses on the Lands and People of the Japanese Empire. Other offerings included lectures and forums on pertinent contemporary problems, and exhibits on Far Eastern ethnology, fine arts, etc. The success of the Institute has warranted the holding of a similar but more comprehensive Institute during the summer of 1938, under the direction of Dr. Hall, Professor J. R. Hayden, late Vice Governor of the Philippine Islands, and Professor C. F. Remer, late Economic Adviser to the American Economic Mission to China. A limited number of small fellowships will be available for qualified persons.

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DR. WALTER W. RISTOW has recently been appointed Head of the Map Room in the New York Public Library. Dr. Ristow has been on the geography staffs of Oberlin, Berea College, and Eastern Washington College of Education.

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Almost a thousand teachers attended the October meetings of the Indiana Council of Geography Teachers. Dr. Robert B. Hall, University of Michigan, talked at two sessions on The Expansion of the Japanese Empire and on, Takaido: Road and Region. Dr. R. W. Karpinski, Indiana State Teachers College, the new president of the state council, reported the Syracuse Meetings. Ida E. Kolb, Principal Escola Americana Preparatory School, Sao Paulo, spoke on Brazil. Social contacts were afforded at the luncheon and breakfast where F. L. Lemler, Secretary of the Bureau of Visual Education, demonstrated the use of Sound Motion Pictures.

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Americans expecting to attend the Meetings of the International Geographical Congress to be held at Amsterdam, July 18-28, 1938, are urged to send in their applications for membership blanks at their earliest convenience to the Secretary of the National Committee of the United States, in care of the Division of Geology and Geography, National Research Council, 2101 Constitution Avenue, Washington, D.C. The last day for registering for excursions is January 31, 1938, as the number is limited for each excursion. A five day excursion along the coast of the Netherlands precedes the Congress, while short excursions following the Congress cover the mining region of the Netherlands, the polders, the glaciated areas, the Wieringen Sea, and the region between The Hague and Rotterdam. A ten weeks' study trip is planned to the Netherlands Indies.

# GEOGRAPHICAL PUBLICATIONS

## Edna E. Eisen. **Our Country From the Air.** 212 pages, 109 illustrations, 1 map. Wheeler Publishing Co., Chicago, 1937.

*Our Country From the Air* is unique. It takes the reader on an imaginary journey by airplane in a zigzagging route of some ten or eleven thousand miles around the outskirts of the United States, with one swing southward from Montana to Salt Lake City and Denver, and another northward from Miami, Florida, to the site of the Wilson Dam. Two shorter round trips of some two or three thousand miles extend eastward from Chicago to Pittsburgh, Cincinnati, and Louisville, and westward to Kansas City, Oklahoma City, and Hot Springs.

The outstanding feature of this book is the large number of full-page aerial views. Of the 212 pages, 109 are used for the pictures. City views number 64; farming and grazing 17; others, 27. To those who have viewed the landscape from the air, these pictures increase the enthusiasm to see more; to others they should arouse a desire to view at least a part of our country from the air; to both groups there should come a greater appreciation of the blessings and the responsibilities that are ours.

This book is more than a picture book. It is geography study—activities that aid in acquiring geographic understandings of the life of people in various sections of the United States. At the bottom of the page that faces each picture, the author has placed questions that direct the reader's attention to features in the picture that are prominent in the geographic personality of the area, and has used the rest of the page in explaining geographically the scene that is depicted. This technique is good even tho occasionally the reader must use his imagination in seeing some of the features to which the guiding statements refer. Such is the case in "stacks of lumber" on page 25, and in the words "U. S. Ft. Pembina" on page 55.

Geography teachers and general readers will welcome this up-to-date publication. The aerial views broaden the concept of an area and afford an opportunity for better understanding of a region. The geography teacher will recognize that the pictures do not supplant the closer views that show man's work more in detail. For example, on page 49 is an aerial view entitled "A Farming District North of Denver." This is an excellent geography picture in that it shows farms on the level land and related snow-capped mountains in the background. However, closer views are necessary to portray some details of the farmsteads, the crops, and the irrigation ditches.

H. HARRISON RUSSELL

*State Teachers College,*
*Bloomsburg, Penna.*

## Thomas A. Blair. **Weather Elements.** 401 pages, 107 illustrations, 4 appendixes, and index. Prentice-Hall, Inc., New York, 1937.

For many years geographers in general and climatographers in particular have been hoping for an up-to-date text in elementary weather science. Their patience has now been rewarded in the publication of "Weather Elements, a Text in Elementary Meteorology." Not since 1912 has there been offered a meteorological textbook that is at once accurate, elementary, and comprehensive.

"Weather Elements" has all the traditional marks of a textbook in its organization, scope and emphasis. And rightly so! From the introductory chapter dealing with the general characteristics of the atmosphere, on thru the observation and measurement of the weather elements, to the final chapter on the United States Weather Bureau, there is the careful, logical and inductive development of weather processes and principles.

The author has taken great pains to see that the subject is completely covered and that it is done so with scientific accuracy. The difficult subject of air mass analysis is treated with a degree of simplicity that is refreshing. One does not have to be a specialist in the field of mathematics and physics to comprehend this book, altho the author (like all good meteorologists) can not resist inserting a few mathematical formulas.

The book is readable, attractive, and well edited. The maps and diagrams, however, detract, not only from the cartographic standpoint but also because they fail at times to depict the real phenomena (witness the diagram of a thunderstorm and of a foehn). Nevertheless, the author has adequately carried out his purpose "to set forth the facts and principles concerning the behavior and responses of the atmosphere in such a way as to enable the reader to acquire an elementary understanding of the physical processes underlying observed weather phenomena."

C. E. KOEPPE

*State Teachers College,*
*Springfield, Mo.*

George D. Hubbard. **The Geography of Europe.** 853 pp., 351 illustrations. D. Appleton-Century Company, New York, 1937. $5.00.

The Geography of Europe by George D. Hubbard (D. Appleton-Century Co.) is a matured work of a dean of American geographers. It is one of the few American textbooks that actually carries the relationship principle intimately into the paragraphs. The book is distinguished because its excellent English is not written down to the student reader. Rather than another factual book of Europe-made-easy, the treatment is sophisticated. Mr. Hubbard's knowledge of Europe is scholarly and much of it first hand. Indeed, he has actually visited every country of which he writes. Of the 850 pages, over 100 are devoted to the European Soviets. This is perhaps the first adequate textbook treatment of Russia.

The book lives up to the promise of the opening quotation, "Europe does not stand for quantity but for quality." It has long been this reviewer's contention that we must teach the quality of life, for only thus will we give to geography the richness of matter such as characterizes history.

RODERICK PEATTIE

*Ohio State University*

Mable Casner and Roderick Peattie. **Exploring Geography.** 481 pp. Harcourt, Brace and Co., New York, Publishers. 1937.

*Exploring Geography* represents the labors of two untiring workers in the field of geography textbooks, and withal, artists in their work. Explorations have always followed discovery. These authors announce new trails into the field of elementary geography that show relationships "between environment and the way men live." They think that pupils in the seventh and eighth grades are ready to grasp principles instead of continuing the study of descriptive and factual material. They define geography as "the relationship between environment and life."

The authors have wrought an elementary textbook in which they relate geography to history, economics, and political and social science, and establish principles. The text is divided into nine units, each one "representing a big idea to be mastered." The problem method is used.

The authors proceed on the hypothesis that geography can help pupils "grow up mentally." Their book is always on the plane of the serious, well-grounded pupil. Each problem opens with a "dramatic episode" from real life. They have included an amazing number of varied "activities" from which pupils may make a choice—charts, graphs, models, dramas, etc. All pupils, in fact, become explorers.

There are 91 charts and maps, and 14 large maps in the Appendix. Pictures appear on almost every page, and often two on a page. The sources of these pictures are in themselves the outstanding result of exploration. Rural life and conservation receive much attention.

Exploring Geography raises these questions in the mind of the reviewer: Does not the book presuppose skilled, highly trained teachers? Can the untrained teacher do the book justice? The book, most certainly, is the kind of text that uplifts the teacher as well as the pupil.

LOUISE W. MEARS

*Milwaukee State Teachers College*

Clare Symonds. **Introductory Geography Course for the Senior High School. Minimum Essentials of Physical-Human-Economic Geography.** 193 pp., 25 illustrations and maps. Clare Symonds, Senior High School. Quincy, Ill. 1936.

This "lesson book," the author frankly states, is based upon two ideas: the mastery, by every pupil, of certain fundamentals, and the working out of "optionals" by those who have mastered the minimum essentials and have surplus time, energy and interest.

The author proceeds to define geography as the "science of the earth and its life" and follows this with brief discussions of four topics: "habitability," "economic activity," "natural environment" and "non-geographic influences." The textual contents following are arranged under three large, sub-divided heads: Agriculture in its Geographic Setting; Economic Activities Related to Natural Resources and Other Geographical Conditions; and Transportation and Commerce in Relation to Geographical and Other Elements of Natural Environment.

The text has much concise material including definitions, statistics, special vocabularies, suggested use of timely news items, and a usable bibliography. There are numerous illustrations of varying worth—charts, diagrams, pictures obviously of personal interest to the author.

The comprehensive Work Book of 101 pages contains about a dozen maps and ninety carefully constructed and distributed exercises including problem-solving, testing by types, a general review by countries, and an outline for the preparation of a term-project report. The author warns her pupils that the exercises are not "busy work," but definite, purposeful aids in the development of an understanding of the relationship of man to his environment.

The author states her teaching technique, methods for encouraging mastery, guidance in the choice of "optionals," and basis for grading the achievements in accomplishing her objectives.

The childish cover design detracts from the "text," but the spacing, type and spiral binding added to the carefully organized, clearly stated material of both books will commend them to teachers who feel the need for just such concentrated, usable material, particularly in working with pupils who have a limited background in geographic concepts.

MABEL WASHBURN

*Shortridge High School, Indianapolis, Ind.*

Frederic B. Loomis. **Physiography of the United States.** 350 pp., 212 illustrations, folded map of physiographic regions. Doubleday, Doran & Co., New York, 1937. **$2.75.**

For many years there has been a real demand for a textbook on the physiography of the United States. One physiographer after another was urged to prepare such a volume,

but with no avail. Finally in June, 1937, from the pen of Frederic B. Loomis, late Professor of Geology, Amherst College, the long looked for book arrived. Physiographers had left the task to a paleontologist.

Before the book had been off the press more than three months, the sad news of Dr. Loomis' death was received. An active career was ended. As a research worker and eminent teacher, Dr. Loomis gave generously to his profession.

The text is divided into two parts: (I) physiographic processes and their effects and (II) regional physiography. Part I deals with such subjects as the physical divisions of the United States, work of the atmosphere, climate, ground water, running water, oceans, glaciation, and vulcanism. Chapters on rock structures and geologic time are also included. Less than one hundred pages are devoted to the introductory material. If this section is intended to prepare beginning students to understand the regional physiography to follow, it is entirely inadequate. If intended as a review of the principles of physiography, it is too brief and elementary to warrant a place in this volume. Only seven pages are devoted to the work of the atmosphere, five to ground water, seven to streams, seven to vulcanism, and seven to glaciers. Unless the student has a pretty thoro knowledge of physiographic processes, Part II of the book will be entirely too advanced.

Part II commences with a chapter on continental shelves. This is followed by a treatment of each physiographic province, starting with the Atlantic Coastal Plain and proceeding westward to the Pacific coast. Numerous sketches, maps, and cross-sections accompany the descriptions. Some of these are very effective, but in several instances the legends are inadequate and inaccuracies exist. The photographs are unusually excellent, and it is to be regretted that more were not included.

In a brief review it is not possible to mention all points noted in a critical reading of a text. Perhaps this is fortunate. In chapter after chapter errors appear which, I am sure, would have been corrected if Dr. Loomis had lived. Many statements are misleading or based upon insufficient information. In the chapter on the Great Plains and again in the chapters dealing with the Rocky Mountains, well-established names are misused. In one place the Flattop Peneplain is called the Rocky Mountain Peneplain and the true Rocky Mountain Peneplain is called the Prairie Peneplain. Later on, the so-called Prairie Peneplain is called the Rocky Mountain. Terms are badly mixed up, leaving the reader in a state of bewilderment.

On page 234 the Teton Range is described as being an asymmetrical fold. Faulting is not mentioned. Such places as Mesa Verde and Uncompahgre Plateau are misplaced. On page 251 the author reproduces a picture of the Grenadier Mountains, calling attention to the peaks which he says rise to the peneplain level. They are actually rugged monadnocks on the San Juan Peneplain. Mistakes of this nature and the frequent omission in the bibliographies of recent authoritative material are extremely unfortunate. It is to be hoped that the book will be carefully revised and become a valuable text in our colleges.

WALLACE W. ATWOOD, JR.

*Clark University*
*Worcester, Massachusetts*

Eugene Van Cleef. **Trade Centers and Trade Routes.** 270 pp., 61 illustrations. D. Appleton-Century Company, New York. 1937.

*Trade Centers and Trade Routes* is another of the Century Earth Science Series edited by Professor Mather, and is the result of a decade or more of study and planning on the part of the author in which he has used several mimeograph editions in developing this volume. Dr. Van Cleef's position in the Department of Geography at Ohio State University, where geography is taught as a major subject in the School of Business Administration and Commerce and Finance, has fitted him especially well for the writing

of such a text. To some this text may seem foreign to the field of geography, but the author approaches it from the geographic point of view and gives us a book that bridges a gap between geography, economics, trade and commerce—in fact, as a college textbook it has no competitor.

The book is divided into two parts—Part I, Trade Centers; and Part II, Trade Routes, to which an equal space is devoted. Attention is focused upon the city, town, and village as trade centers. It is pointed out that trade centers can be interpreted accurately only if their integral relation to the physical and functional environment be recognized. The means of integration may be material, such as highways, or intangible, such as ideas; consequently the terms "Trade Center" and "Trade Route" are used in a new and broader sense. "Trade Center" includes every form of settlement, and "Trade Route" includes such phenomena as language, the telephone, motion picture, radio, and postal service, to which the author devotes four chapters. The chapters on Trade Centers—Plans and Patterns, Functional Structure of the Trade Center, and Definition of the Trade Center are high lights in the book.

There are sixty-one illustrations, fourteen of which are pictures, and forty-seven, maps, diagrams, and sketches. The latter may be considered a great asset to the book.

Professor Van Cleef has given us a college text in a field where it is without competition at present, and, needless to say, much needed. Without question this book should be considered one of the greatest recent contributions to the field of geography, as it bridges a gap between geography, economics, and commerce.

BERT HUDGINS

*Wayne University*

Glenn T. Trewartha. **An Introduction to Weather and Climate.** 373 pages, 108 illustrations, 7 plates (one colored), 2 appendixes, and an index. McGraw-Hill Book Co., New York, 1937. $3.00.

Geographers thruout the country will welcome this, the first attempt to treat the principles of weather and climate accurately, fully, and with the geographic point of view. As the author states, the book makes no pretense of being a textbook in meteorology and its merit lies in the choice of material and in its structure of organization.

An introduction and four chapters cover the real principles of of weather and climate —about one-half of the book. The material is above all accurate, and it embraces the latest developments in the field of weather science, even devoting considerable attention to the relatively new concept of air mass analysis. Little attention is given to the observation of weather elements, but the principles and processes of weather are adequately treated. World distribution of climatic elements is well covered. The author makes no attempt to separate weather and climate, and he weaves the two into a closely knit pattern with the human relationship as the motif. He departs only occasionally from his endeavor to be meticulously accurate as in his use of a diagram of a thunderstorm in which the impossible attempt is made to show in one illustration the several successive stages in the development of a thunderstorm.

The next five chapters of the book are devoted to a discussion of climatic regions. Here the style changes; the treatment becomes more descriptive and only slightly causal. The author uses as a basis for his discussion a regional classification of climates made up of a combination of the Köppen, Thornthwaite, and other systems. His treatment is decently complete and unusually interesting despite his rather frequent use of figures. Here, geography is the theme, dressed in no more of climatology than is strictly necessary.

Geographers should feel duly grateful to the author for his efforts to write a book on a difficult subject. To be complete is one thing; to be scientifically accurate is quite another. Professor Trewartha has obviously (and as he admits) drawn freely upon others

for much of his material, altho it seems unfortunate that he should not be more generous with credit lines. He is to be commended, however, upon his careful descrimination in selecting the wheat from the chaff.

C. E. KOEPPE

*State Teachers College,*
*Springfield, Mo.*

Emil Ludwig. **The Nile, The Life Story of a River.** 603 pp., 50 photographs and 6 maps. The Viking Press, New York City, 1937. $5.00.

In many of its pages this book called to mind H. M. Tomlinson's "The Sea and the Jungle." It contains a huge selection of unforgettable pictures, painted by a master craftsman: of the vegetation of the tropical rainforest, of native hunting scenes and intertribal wars, of gold mining in Nubia, and of a sandstorm on the desert—to mention only a few. Many items of special interest to the geographer are discussed, among which should be mentioned the native practice of burning the coarse grass of the semi-arid region between Malakal and Kosti every year so the cattle can feed on the new sprouts. We learn that deforestation in Abyssinia, within historic times, accounts in large measure for the huge increase in the amount of silt carried by the Blue Nile. And the lowly termite, in loosening the soil, greatly aids the forces of erosion. The Dinka Negroes are great tall fellows who have adjusted themselves to living in the swamps. They stand on one leg, motionless as cranes, when out fishing. Those chapters dealing with the development of the slave trade in conjunction with the search for ivory are very well written. The impact of modern Occidental civilization, with its gegaws and gadgets, on the Upper Nile Negro, who has thereby lost his precious birthright—the right to live in idleness—is vividly pictured.

This volume is further proof that translating from the German is a difficult task. Many sentences were allowed to grow too long and flabby, and occasional phrases, literally translated, jar on the reader's nerves.

German writers know how to drive their main points home with vigor. Professor Alfred Philippson does this admirably in his classic, "Das Mittelmeergebiet," and Ludwig does the same in "The Nile." He makes us see that while the barbarians of northern Europe were slaughtering each other in tribal wars, the people who had forsaken the nomadic life to become cultivators along the Nile were forced to coöperate in order to survive. Coöperation and patience were carried almost too far, however, because it was always the poor "fellahin" who sweated to pay their exploiters. No matter who, literally, had the whip hand, whether Greeks, Romans, Moslems, or English, it was the miserable fellahin—at the base of the social and economic pyramid—who felt the lash. Only after millenniums of dreadful oppression would they revolt. The English are given full credit for their brilliant engineering feats in Egypt, even if the underlying motive was to make Manchester independent of Texas. Altho England wanted to rule more justly than its predecessors, a healthy Egyptian people, it did not, even under Lord Cromer, foster education, for fear too many people might hear of the rights of man. This attitude still persists and the English today do not treat even the high class Egyptian as a social equal.

The author occasionally soliloquizes. He preaches rather than instructs. He talks loudly to himself, like a character in an O'Neill play, but with side glances, hoping to see the audience attentive. Granted that it be true, it gets monotonous to be told no less than a dozen times, in many different ways, that "it is not racial purity but the mingling of alien races that creates health and strength." Whatever else may be said of this work, it is not only fascinating reading but epic in its scope.

RAYMOND E. CRIST

*University of Illinois*